Advance

AUDIO SIGNAL GENERATOR

Type H1

Including H1/E, H1/NA

INSTRUCTIONS

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ADVANCE AUDIO FREQUENCY SIGNAL GENERATOR

TYPE H1

INTRODUCTION

This instrument is intended primarily for fidelity and distortion checks on radio and television receivers, and high quality audio frequency amplifiers and record players. For these purposes, the wide frequency coverage of 15 to 50,000 c/s at constant voltage, and the low distortion of less than 1%, will be found ideal.

An optional square wave output is provided, which gives a good waveform approximately 50 : 50 ratio up to about 25 kc/s. This is useful for checking transient responses of video and other wide band amplifiers.

INSTRUCTIONS

POWER SUPPLY

The instrument is normally despatched with mains transformer set to operate from 210 to 250 volt supplies. For operation at 105 to 125 volts it is necessary to change the tapping. To do this : remove the disc on the underside of the case, exposing the mains transformer. For 210 to 250 volts input tag 2 is connected to tag 3. For 105 to 125 volts remove the connection between tag 2 and tag 3, connect tag 1 to tag 2 and tag 3 to tag 4. Replace the cover disc.

The instrument is suitable for a.c. supplies ONLY, at frequencies between 40 c/s and 100 c/s.

Model HI/E is for operation at 110 to 125V, 140 to 160V and 220V, 40 to 100 c/s.

The model HI/NA is supplied with the transformer permanently set to operate on 115 to 120 volt supplies, at 25 to 60 c/s only.

VALVES AND ACCESSORIES

2 valves type 6SN7GT Brimar
1 valve type 6X5GT Brimar
1 thermistor type A15 S.T.C.
1 pilot lamp type M.E.S. 11 mm, 6.5 volts

A low capacity audio frequency lead, type PL29, complete with plug and crocodile clips, is supplied with the instrument.

FREQUENCY RANGE

A sinusoidal signal of any frequency between 15 c/s and 50 kc/s is obtainable with an accuracy of ± 1% ± 1 c/s by means of a directly calibrated dial and a three range selector switch. The ranges are :—

A	-	4,000	-	50,000 c/s
B	-	300	-	4,000 c/s
C	-	15	-	300 c/s

The total scale length is approximately 18 inches.

SINE WAVE OUTPUT

By means of the step and variable attenuators, a sinusoidal output at any level between 200μV and 20V is available from the OUTPUT socket at any frequency on the dial.

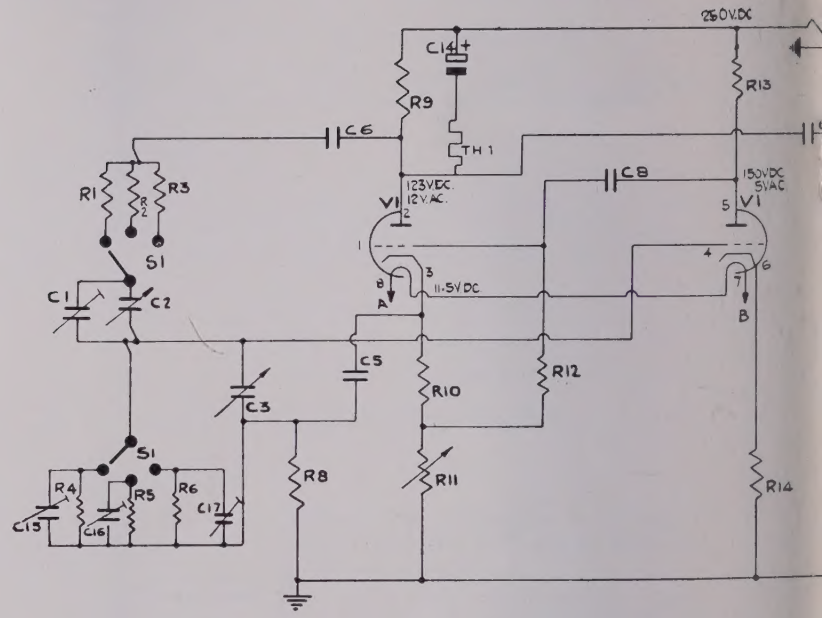
The voltage into the attenuator is maintained constant within ± 1 dB of the nominal value by means of the internal circuits of the generator, and a further variation of ± 1 dB may be found on the attenuated output, due to the use of 5% resistors in the attenuator.

The distortion of the output voltage is extremely small, as each generator has a measured total distortion factor of less than 1% at 1,000 c/s when checked at the factory. Normally the distortion is less than 1% between the limits of 100 c/s and 10 kc/s. The distortion consists of harmonics of the signal frequency, and hum at power supply frequency, in approximately equal amounts. It is measured on a normal type distortion meter, on which the percentage distortion is given as follows :—

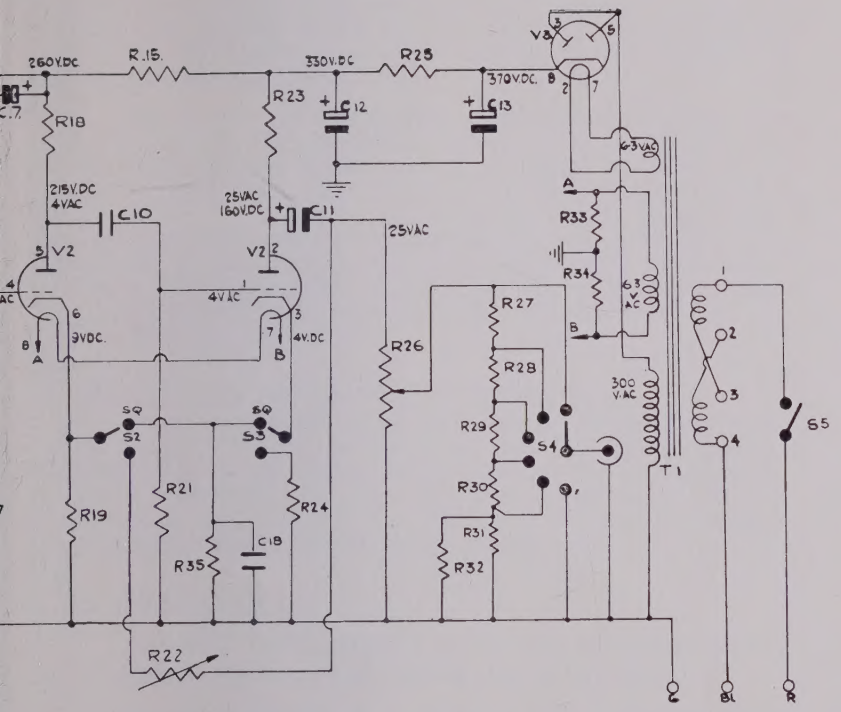
$$D\% = \frac{\sqrt{V_{hum}^2 + V_{2f}^2 + V_{3f}^2}}{V_f}$$

RESISTORS

Ref.			*Description*		
R1	13M	± 1%	2W	Welwyn high stability	PN6700
R2	1M	± 1%	½W	Welwyn high stability	6701
R3	70K	± 1%	½W	Welwyn high stability	6702
R4	13M	± 1%	2W	Welwyn high stability	6700
R5	1M	± 1%	½W	Welwyn high stability	6701
R6	1M	± 1%	½W	Welwyn high stability	6702
R7	Not used				
R8	330K	± 10%	¼W	Erie RMA 9	4408
R9	22K	± 10%	1W	Erie RMA 2	3248
R10	500 Ω	± 10%	¼W	Erie RMA 9	6704
R11	5K		1/3W	Dubilier preset pot	6717
R12	220K	± 10%	¼W	Erie RMA 9	6703
R13	22K	± 10%	1W	Erie RMA 2	3248
R14	1K	± 10%	¼W	Erie RMA 9	1175
R15	4.7K	± 10%	1W	Morgan type Y	10905
R16	Not used				
R17	220K	± 10%	¼W	Erie RMA 9	6703
R18	22K	± 10%	1W	Erie RMA 2	3248
R19	5K	± 5%	¼W	Erie RMA 9	6705
R20	Not used				
R21	220K	± 5%	¼W	Erie RMA 9	6703
R22	25K			Linear W.W. Colvern pot	6814
R23	22K	± 10%	1W	Erie RMA 2	3248
R24	500 Ω	± 10%	¼W	Erie RMA 9	6704
R25	2.2K	± 10%	1W	Morgan type Y	10767
R26	50K			Linear W.W. Colvern pot	6716
R27	68K	± 5%	½W	Erie RMA 8	6711
R28	6.8K		¼W	Erie RMA 9	6712
R29	680 Ω	± 5%	¼W	Erie RMA 9	6713
R30	68 Ω	± 5%	¼W	Erie RMA 9	6714
R31	15 Ω	± 5%	¼W	Erie RMA 9	6709
R32	12 Ω	± 5%	¼W	Erie RMA 9	6710
R33	22 Ω	± 10%	½W	Erie RMA 8	6850
R34	22 Ω	± 10%	½W	Erie RMA 8	6850
R35	2.2K	± 10%	¼W	Erie RMA 9	862
R36	1.2K	± 10%	¼W	Erie RMA 9	1177



NOTE.—Every effort is made to keep this drawing up to date, but the right is reserved to adjust the values or amend the circuit without notice



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CAPACITORS

Ref.		*Description*		
C1	3-50pF		Philips Trimmer	PN
C2	13-532pF		Variable } Polar	
C3	13-532pF		Variable } E24	1
C4	Not used			
C5	0.1μF ± 10%	350v d.c. wkg.	TCC CP46S	
C6	0.1μF ± 10%	350v d.c. wkg.	TCC CP46S	
C7	8μF	500v d.c. wkg.	Electrolytic, Dubilier Part of C.R.E	
C8	0.1μF ± 10%	350v d.c. wkg.	8 TCC CP46S	
C9	0.1μF ± 10%	350v d.c. wkg.	8 TCC CP46S	
C10	0.5μF	350v d.c. wkg.	Hunts W.49 B.514	
C11	8μF	450v d.c. wkg.	Electrolytic, Hunt,	1
C12	16μF	500v d.c. wkg.	Part of C.R.E.	
C13	16μF	500v d.c. wkg.	Part of C.R.E.	
C14	8μF	450v d.c. wkg.	Hunts	1
C15			Wire Trimmer	1
C16			Wire Trimmer	1
C17			Wire Trimmer	1
C18	0.005μF ± 15%		Hunts M. S.W.K.	

MISCELLANEOUS

Ref.	*Description*		
V1	Brimar	6SN7GT	PN5873
V2	Brimar	6SN7GT	5873
V3	Brimar	6X5GT	3150
S1	Range switch	2-pole, 3-way	6696
S2 } S3 }	2-pole changeover toggle switch		6846
S4	Atten. switch	1-pole, 6-way	6697
S5	Mains On/Off		Part of R26
T1	Mains transformer		MT294C
TH1	S.T.C. Thermistor A15		6719

SQUARE WAVE OUTPUT

By setting the SINE/SQUARE switch to the SQUARE position, the output is converted into a square wave of approximately 50 : 50 form. In this case, the output voltage range becomes 800μV to 80V peak-to-peak approximately, and the tolerance on frequency becomes about $\pm$ 3%.

The square wave rises to 90% of its peak value in less than 3μs at 10 kc/s. The rate of rise is similar at all other frequencies, resulting in a rapid deterioration of the square waveform above about 25 kc/s, but maintaining a sharp rise and fall at low frequencies. Below about 50 c/s a tilt appears on one flat of the square wave, and this becomes quite pronounced at 15 c/s. However, the other flat remains good, as do the rise and fall times of the edges. Due to the by-passing effect of stray capacities, the higher frequency square wave will be improved with the attenuator switch at a low impedance position.

CONNECTION TO EQUIPMENT UNDER TEST

Due to the feedback circuit used, there is a constant d.c. potential of about 8V at the high potential end of the output potentiometer. This appears at the output socket via the step attenuator, and is attenuated in the same way as the signal output. If it is desired to block this d.c. from the circuit under test, a suitable capacitor should be inserted in the output lead.

MAINTENANCE

To remove the instrument from the case, proceed as follows:

Remove the dome nut from the rear of the case.

Lay the instrument on its back and remove the four screws in the corners of the panel, each a little at a time. The panel will be lifted from the case.

To Reassemble: Lay the case on its back and replace the instrument. Engage the threads of the corner screws, stand the instrument upright and carefully screw up the panel evenly, making sure the back chassis bolt appears through its clearing hole in the case. The dome nut must then be replaced.

The 6SN7GT and 6X5GT valves can be seen at the back of the chassis. Replacement of any of these valves should normally cause no trouble, and will not affect the performance of the instrument.

The thermistor is situated inside the screening box, just below the range switch. Should a replacement be required, a tested thermistor should be obtained from this company.

Due to the high resistances used on the low frequency range, the instrument is sensitive to humidity. This is evidenced by weakness or cessation of oscillation on Range C, together with a drift of frequency. If this occurs, then the instrument should be left switched on. After about 15 to 30 minutes the moisture will be dissipated by the internally generated heat, and normal operation will return.

In all cases of difficulty the instrument should be returned to the factory for repair or adjustment.

Part No. 9168

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